When Will People Pay to Pollute?
Environmental Taxes, Political Trust, and Experimental Evidence from Britain

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Abstract
This paper presents results from survey experiments investigating conditions under which Britons are willing to pay taxes on polluting activities. People are no more willing if revenues are hypothecated for spending on environmental protection, while making such taxes more relevant to people—by naming petrol and electricity as products to which they will apply—has a modestly negative effect. Public willingness increases sharply if people are told that new environmental taxes would be offset by cuts to other taxes, but political distrust appears to undermine much of this effect. Previous studies have argued that political trust shapes public opinion with respect to environmental and many other policies. But this paper provides the first experimental evidence suggesting that the relationship is causal, at least for one specific facet: cynicism about public officials' honesty and integrity. The results suggest a need to make confidence in the trustworthiness of public officials and their promises more central to conceptualisations of political trust.

Keywords
Environmental taxes; political trust; survey experiments; multilevel models

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Natural scientists have no doubt that pollution and resource use by humans are transforming the earth in ways that are fundamentally unsustainable (Rockström et al. 2009). This is all the more tragic given that many such transformations are unnecessary: policy experts point to effective, low-cost solutions (e.g., Tietenberg 2013). Above all, mainstream environmental economics recommends that governments attach a price to polluting activities, in order to discourage polluters from imposing (externalising) the costs of their polluting activities onto others (Parry, Norregaard, and Heine 2012). Correcting the price a polluter must pay to engage in a polluting activity using a tax or obligation to surrender a tradable emission permit should be a cost-effective means of protecting the environment and maximising social well-being (Mirrlees et al. 2011; Rajah and Smith 1994). In practice, where such market-based mechanisms have been introduced, their record has generally been excellent.[1]

Yet they are not actually being introduced very much. The environmental tax share of all public revenues in the European Union barely changed between 2006 and 2013 (Eurostat 2015), for example, and has generally been falling since the mid-1990s (Stamatova and Steurer 2013). In the UK specifically, revenue from environmental taxes peaked as a share of all total taxes and social contributions in 1998, and has changed little since 2001 (Office for National Statistics 2015). Given the growing scientific consensus about the seriousness of many environmental problems, why are

[1] The U.S. SO_2 trading scheme and British Columbia's carbon tax are two examples of market-based measures for environmental protection that have proven extremely effective (Elgie and McClay 2013; Schmalensee and Stavins 2013). The European Union's Emissions Trading System is sometimes held up as evidence of ineffectiveness, but that scheme's failure to attach a meaningful price to greenhouse gas emissions was due to the unanticipated economic contraction of recent years, and the resulting surplus of allowances. Overall the EU has been achieving substantial greenhouse gas emission reductions (European Environment Agency 2015).

governments making so little use of market-based instruments for environmental protection?

One major reason is public scepticism, if not outright hostility. Public opposition has killed efforts to introduce market-based mechanisms in places such as Australia (Baird 2014), Canada (Harrison 2012), and Switzerland (Maclucas 2015; Thalmann 2004).[2] We therefore need to know more about the sources of public opinion with respect to environmental protection generally, and how to present problems and solutions such that public opinion will allow states to take action (Keohane 2015: 24; see also Bernauer 2013; Cao, Milner, Prakash, and Ward 2014). This paper aims to expand our understanding of conditions under which people are less hostile, and more open, to proposals for environmental protection using the market-based mechanism that is environmental taxation. The results in the paper should be of interest not only to scholars of environmental politics and public opinion, but also to policymakers and advocates seeking to foster public support.

The headline result of the experiments presented here is that offsetting new green taxes with cuts to other taxes substantially increases public support, but framing revenue neutrality as merely a government promise rather than a fact appears to undermine much of the positive effect of offsetting.[3] Stating that the new green tax revenues are to be spent on the environment has no impact on support. Making the increased taxation more real to people by pointing out that it would apply to goods and services they purchase also has no effect, unless reference is made to the taxation

[2] Some governmental reluctance to engage in better environmental protection is clearly due to lobbying by firms with an interest in externalizing their environmental costs (Farrell 2016); yet businesses are also sometimes open to the introduction of new environmental policies (see e.g., Pulver 2007).

[3] This paper uses "green taxes" and "environmental taxes" interchangeably.

of petrol and electricity specifically, in which case support declines. And these effects do not differ much even for people with quite different baseline attitudes.

The impact of framing revenue-neutrality as a promise rather than a fact strongly supports prior claims, based on observational data, that political distrust is an important reason for people's scepticism of market-based measures for environmental protection. Green tax increases are typically implemented in tandem with offsetting tax reductions elsewhere (Tietenberg 2013), often with the objective of winning public acceptance, and the results here validate that revenue neutrality should indeed be a powerful means of building support. But majorities of citizens in all countries do not to believe that politicians keep their promises (Naurin 2011), and there appears to be widespread scepticism that revenue-neutrality will materialise in practice. As such, convincing the public to trust that governments will keep their promises on revenue-neutrality is a key challenge for environmental policymakers and advocates; seemingly, until voters are convinced, they will remain hostile.

More broadly, this study—the first to use experimental data in testing for a causal relationship between political trust and policy attitudes—suggests a need for a change of emphasis in definitions of political trust. Prior research has generally considered political trust to be about people's satisfaction with their governments' overall performance (e.g., Hetherington 2005; Hetherington and Husser 2012; Hetherington and Rudolph 2015; Rudolph 2009; Rudolph and Evans 2005). In contrast, the present study isolates cynicism—perceptions of a lack of honesty and integrity on the part of public officials—and finds that this sentiment by itself exercises considerable influence on people's attitudes. Whether or not they are happy about government performance, then, expectations about whether politicians will keep their promises are clearly an important determinant of people's policy preferences.

The Policy and Politics of Environmental Taxation

The European Union defines environmental taxes as those "whose base is a physical unit (for example, a litre of petrol or a passenger flight) that has a proven negative impact on the environment" (ONS 2015). By this definition, environmental taxes in the UK summed to £44.6 billion in 2014, representing 7.5% of all public revenue from taxes and social contributions, with households paying an average of £765 each for environmental taxes in 2012 (ibid.).[4] Britain is fairly typical in the OECD in terms of the environmental tax share of all public revenues (see Parry, Norregaard, and Heine 2012: 103, citing data from OECD 2010).

What would it take to increase this share? Prior studies have identified a variety of macro-level conditions shaping countries' use of environmental taxes—Ward and Cao (2012) for example emphasise the power of the energy-producing sector. Yet there is widespread agreement that public opinion also influences environmental policy, and therefore that social scientists need to better understand that influence (see Bernauer 2013; Cao, Milner, Prakash and Ward 2014). Politically, the introduction of any new tax presumes a certain measure of public "support, consensus, or even merely passive tolerance" (Pearson 1995: 358). Unfortunately, taxes remain an unpopular way of addressing environmental problems, even if they are a relatively popular kind of tax (Jagers and Hammar 2009). Environmental taxes are unpopular because all taxes are unpopular (Chartered Institute of Taxation (2009, cited in Smith 2009).

There is a rapidly expanding research literature on environmental attitudes generally. A number of works in sociology, for example, have addressed the

[4] Such taxes include the UK's climate change levy, aggregates levy, landfill tax, EU emissions trading scheme, carbon reduction commitment, and carbon price floor (ONS 2015).

demographic correlates of environmental concern, defined as "concern about environmental problems and support for environmental protection" (Dunlap and York 2008). Such studies have focused largely on the importance of income (at both the national and individual/household levels), as well as underlying general values (e.g., Fairbrother 2013; Shwom, Bidwell, Dan, and Dietz 2010). Beyond the demographic characteristics of individuals that correlate with different kinds of environmental attitudes, though, we still know little about the substance of the beliefs that lead people to hold the attitudes and preferences they do.

This article builds on a number of prior studies of environmental attitudes generally that have made good use of questions about taxation. Survey questions about a respondent's "willingness" to pay taxes admittedly leave somewhat implicit the scenario in question, but most respondents would seem likely to understand that the question is about a potential tax *policy* change, not about whether the respondent will choose individually to cheat on his/her taxes. As such, this is a different issue than tax compliance (on which see for example Bodea and LeBas 2016). Questions about taxation are also useful insofar as they interrogate people's valuation of environmental protection at some cost (Cao, Milner, Prakash, and Ward 2014: 302). In the absence of any trade-off, supporting environmental protection would seem a given. What is more telling is whether people care enough about environmental quality such that they are willing to pay a price for it.

Public Support for Environmental Taxes

Aside from studies of how preferences differ according to background demographic and attitudinal characteristics, a small number of previous studies have sought to illuminate conditions under which people are more supportive of

environmental taxes (Dresner, Dunne, Clinch, and Beuermann 2006; Hsu, Walters, and Purgas 2008; Jagers and Hammar 2009; Hammar and Jagers 2006; Kallbekkenn and Sælen 2011). Much of what we currently know also comes from public opinion polls little connected to the academic research literature, such as those conducted by a self-styled "Green Fiscal Commission" (GFC) in Britain in the late 2000s.

Aside from prior empirical findings, some expectations can be derived theoretically.[5] The literature on public attitudes towards taxes in general suggests that people are at least partly rational (Campbell 2009), in the basic sense that they seek to reduce the tax burden they have to pay, while seeking public benefits. With respect to the environment, then, while people are willing to pay a price for tackling problems like climate change (Tingley and Tomz 2014), they are nonetheless sensitive to the costs (Bechtel and Scheve 2013). At the same time, however, the public's fiscal preferences are also far from rational, in that they are contradictory. As Schenk (2011: 288) puts it: "Voters [send] conflicting signals to their representatives: they want programs but they do not want to pay for them." McCaffery and Baron (2006: 132) agree: "The average person suffers from a wide range of heuristics and biases in thinking about tax and public finance, leading to inconsistent judgment and decision making." Most importantly, people appear not to attach much weight to the benefits that potential new tax revenues might provide. Environmental tax policy preferences should therefore reflect the relative saliences of the direct costs and benefits that different proposals represent to survey respondents. Where people are made to think to think more about the costs to themselves, or made to think that those costs will be greater, their acceptance of environmental taxation should be lower. Conversely,

[5] In general, environmental research in political science has thus far developed in a fairly atheoretical way (Cao, Milner, Prakash and Ward 2014).

people should be more accepting of tax proposals if made to think about ways in which such proposals might provide them with clear benefits.[6]

From this basic theoretical premise, and in light of what empirical literature there is on attitudes towards environmental taxes, I derive five hypotheses in the remainder of this section.

First, people should be more accepting of new environmental taxes if those taxes are offset with reductions to other taxes, insofar as people should perceive substantially lower net costs to themselves than they would in the absence of such offsetting. Consistent with this expectation, the Green Fiscal Commission (2007) found much stronger support for revenue-neutral than for revenue-increasing green taxes. Another study found that Americans' support for carbon taxes rose when it was tied to offsetting reductions in income tax (Ansolabehere and Konisky 2014; see also Kaplowitz and McCright 2015). Still, questions remain about the robustness of this relationship, particularly as many people appear not to believe or understand that a revenue-neutral tax shift can be beneficial for the environment (Dresner, Dunne, Clinch, and Beuermann 2006; Kallbekkenn and Sælen 2011).

Hypothesis 1: Offsetting environmental tax increases with tax cuts elsewhere will increase willingness to pay.

[6] This general theory of public attitudes to taxation derives from basic findings in behavioural economics. In this regard, Schenk (2011: 264) refers to the influential work of Tversky and Kahneman (1974) in summarising that:

> Individuals are often biased in that they rely too heavily on information that is readily available or prominent, ignoring information that they do not see as often or as readily or that is in the background. ... Thus, the salience (prominence) of an object or idea is one factor that may cause the use of an availability heuristic to affect behavior.

Second, people may not think that environmental taxes will cost them much money, insofar as they do not actually think of themselves as "polluters." This is because people "externalise responsibility" a great deal (e.g., Lorenzoni, Nicholson-Coleb, and Whitmarsh 2007). They seek to avoid blame for contributing to environmental problems, ascribe responsibility instead to corporations and governments, and "do not accept that the main responsibility for taking action against climate change lies with individuals and families" (Gough 2011). It may then be the case that respondents respond more hostilely to proposals for environmental taxation the more they are confronted with suggestions that their own lifestyles have environmental impacts—not just because they resent being framed as "polluters" but also because they understand that they should then expect to pay more in tax.

Hypothesis 2: Drawing people's attention to the fact that environmental tax increases will apply to their consumption and spending will reduce willingness to pay.

Third, naming specific examples of goods that would be covered by potential new green taxes might make the likely costs of such taxes even more salient to people, and therefore objectionable. Consistent with this suggestion, some previous studies have found that support for environmental taxes is particularly low where the tax will apply specifically to domestic energy and vehicle fuels (Green Fiscal Commission 2009; Hsu 2010; Jagers and Hammar 2009). In two U.S. states, for example, Shwom, Bidwell, Dan, and Dietz (2010) found that taxes on petrol were the least popular environmental policy instrument, by far. In the case of the UK, the taxation of energy specifically is quite heavy (second highest in the EU), with most of

the tax burden falling on households (Stamatova and Steurer 2012).[7] Yet transport fuels and home energy are generally quite polluting, and so are likely candidates for additional taxation.

Hypothesis 3: Naming specific goods to which new environmental tax increases would apply, such as petrol and electricity, will reduce people's willingness to pay.

Fourth, people should be more accepting if their attention is drawn to ways in which the money they pay out in taxes is nonetheless put to beneficial purposes. The literature suggests in particular that many people perceive environmental taxation as more legitimate if the associated revenues are also spent on the environment, possibly because they do not understand that a tax can be beneficial through its incentive effects. In the case of an energy tax change in Germany, for example, some members of the public specifically "demanded that energy taxes be used to promote energy savings and subsidize public transport" (Kohlhaus and Meyer 2005: 141, quoted in Harrison 2010: 519-20). Many studies therefore find "that earmarking the revenues from environmental taxes for environmental purposes increases their popularity" (Kallbekkenn and Sælen 2011: 2967—see for example the Green Fiscal Commission 2007; Kaplowitz and McCright 2015).[8] From a policy perspective, both the Chartered Institute of Taxation (2009, cited in Smith 2009) and the House of Commons

[7] Mirrlees et al. (2012: 669) note that: "taxation of gasoline and diesel is the most substantial excise tax in the United Kingdom, accounting for 5 percent of all tax revenue."

[8] In one survey in 2007, the Green Fiscal Commission asked a nationally representative sample of respondents: "In principle, do you think you would support or oppose green taxes?" 51% reported support, and 32% opposition. They then asked: "What if there was a guarantee that the money generated by the extra tax was spent directly on projects that would help to reduce carbon dioxide emissions—for example, the money could be used to subsidise public transport or home insulation. In principle, would you support or oppose an increase in green taxes if the money was spent in this way?" 73% reported support, and only 17% opposition.

Environmental Audit Committee (2011) argue that hypothecating revenues for spending on environmental protection should increase public support.

Hypothesis 4: Hypothecating the revenues from increased environmental taxes for spending on environmental protection will increase willingness to pay.

Finally, if people's acceptance depends on whether new environmental taxes are revenue-neutral and/or on how revenues are spent, people may be hostile to proposals for new environmental taxes if that they do not believe governments will actually introduce the new taxes as promised—cutting other taxes and/or spending new revenues on the environment (Hammar and Jagers 2006; Hsu, Walters, and Purgas 2008). As the Chartered Institute of Taxation (quoted in Smith, 2009) notes, "people do not trust governments to implement the environmental taxes in a fiscally neutral way." Instead, people regard taxes on energy for example as "stealth taxes": an Ipsos MORI poll in 2008 found for example that 59% of Britons agreed that "climate change is being used by the Government as an excuse to raise taxes" (Ipsos MORI 2010: 67). And Harrison (2012: 393) notes that even in the case of British Columbia—where a carbon tax has proven politically sustainable—"voters simply did not believe the government's reassurances that the tax was revenue neutral" (see also Shwom, Bidwell, Dan, and Dietz 2010: 480). Respondents could then distrust that governments will fulfil their promises to make new green taxes revenue-neutral and/or to use the revenues they generate specifically for spending on environmental protection.

Hypothesis 5a: Framing the dedication of revenues from environmental taxes to spending on environmental protection as a government promise will reduce willingness to pay relative to framing it as a fact.

Hypothesis 5b: Framing revenue-neutral offsetting as a government promise will reduce willingness to pay relative to framing it as a fact.

In testing these last two hypotheses, this study builds on prior research arguing that trust, including particularly political trust, shapes support for environmental protection (e.g., Duit 2010; Hammar and Jagers 2006; Harring 2013; Konisky, Milyo, and Richardson 2008; Lubell 2002; Meyer and Liebe 2010; Rudolph and Evans 2005).[9] Previous studies have all, however, all been based on observational data. This limitation reflects that it is clearly not possible to randomly assign subjects to different levels of political trust, in the sense of perceptions of whether the government "is producing outcomes consistent with their expectations... a pragmatic running tally of how people think the government is doing at a given point in time," to quote Hetherington's (2005: 9) influential definition. But the experiment here nevertheless investigates the impact of political distrust, by randomly assigning subjects to conditions under which political trust explicitly is or is not relevant. In some scenarios a key policy feature is presented as a government "promise," meaning that respondents' preferences should reflect their expectations about the probability that the people running the government will fulfil their promises. In other scenarios, the same feature is presented simply as a fact, making such expectations irrelevant.

[9] It also responds to Hetherington and Husser's (2012: 323) call for more research on the relationship between political trust and public preferences with respect to environmental policy.

Prior observational research has typically measured political trust using one or more broad questions about respondents' overall confidence or trust in parliament, politicians, etc. and/or about how often they think the government "does what is right" (e.g., Hetherington and Rudolph 2008; McLaren 2011; Rudolph 2009; Rudolph and Evans 2005). The experiment here, in contrast, isolates and tests the specific impact of cynicism—"the integrity dimension of political trust" (Dancey 2012: 412). This is a somewhat different conception of than is typical in the literature, with a different emphasis than Hetherington's influential performance-focused view. The conception here instead focuses on people's expectations about honesty and promise-keeping (e.g., Levi and Stoker 2000; Dalton 2005), and their beliefs about the trustworthiness of government promises.[10] This perspective echoes earlier work explicitly equating political distrust to cynicism (e.g., Miller 1974), and reflects that a decision to trust presumes "the expectation that [a] trustee will do X, framed in terms of a probability" (Ermisch, Gambetta, Laurie, Siedler, and Uhrig 2009).

The analyses below contrast how people's willingness to pay new environmental taxes depends both on their cynicism as measured using baseline questions about their generic views of "the people running the government" and as measured by the effect of framing policy features as government promises. These analyses contextualise prior studies' findings about the consequences of political trust and test whether political cynicism is indeed, as some have it, "neither deeply felt nor behaviorally potent" (Citrin and Muste 1999: 469, quoted in Dancey 2012: 413).

[10] Levi and Stoker (2000: 498) note that survey research based on the general trust questions above "leaves trustworthiness undefined, open to the interpretation of the potential truster." Such an approach may have its merits, but it clearly does not help specify what aspects of political trust operate to influence people's policy attitudes. Hetherington (2005: 16) also acknowledges considerable "slippage between the concept of political trust and the survey items used to measure it."

Models presented below also investigate how the impacts of the randomly assigned treatments differ across respondents with a variety of characteristics that might shape their responses to the treatments. These characteristics are: belief versus scepticism in climate science; left versus right/liberal political views; political cynicism (as discussed above); interest in politics (a characteristic closely related to political dis/trust); and political party identification (Conservative versus Labour). First, Britons who do not believe in the seriousness of environmental problems might well fail to respond to any attempts to shift their willingness to pay new green taxes, insofar as they may lack a baseline reason to support efforts for protection. Second, people subscribing to right-of-centre political views may resent the state regulatory intervention embodied by any kind of taxation, and so they too could be less sensitive to efforts for increasing their willingness to pay.[11] Third, people with low levels of baseline political cynicism as captured by standard attitudinal measures should be less bothered by suggestions that appealing features of green tax proposals are just government "promises"; testing whether this is indeed the case will help assess the value of those measures. Fourth, people with little interest in politics would appear least likely to be knowledgeable about public policy, and so to appreciate how green taxes can incentivise behaviour change; they might therefore respond differently to key features of proposals new green taxes. Fifth, sympathisers of the main opposition political party might respond differently to some treatments, particularly as they may be less trusting in the politicians making up the current government.

[11] Ward and Cao (2012) have found a significant left–right gradient in the composition of legislatures adopting more green taxes, validating arguments that environmental protection is more a concern of the political left than the right.

Research Design, Data, and Analytical Methods

Social scientists are making increasing use of survey experiments to understand the public's attitudes towards environmental degradation and protection (e.g., Bernauer and Gampfer 2013; Bechtel and Scheve 2013; Tingley and Tomz 2014; Kaplowitz and McCright 2015). I designed an experiment in which each respondent to a nationally representative survey received one of several different versions of a commonly used opinion question about support for environmental protection. The question specifically investigated support for environmental protection in the form of taxation, the base version reading: "How willing would you be to pay higher taxes in order to protect the environment? Not at all willing, not very willing, fairly willing, or very willing?" The International Social Survey Programme has previously used this question, across multiple waves, and a question similar to it has also been included in the World Values Surveys/European Values Studies.[12]

Respondents were randomly assigned to five treatments in ten different combinations—see Table 1 below (and also Appendix A, for the complete wordings of the ten different versions of the question). The five experiments running simultaneously investigated the impact on people's responses of:

1. Stating that new environmental taxes would be offset by cuts to other taxes. (According to hypothesis 1, offsetting should increase support.)
2. Emphasising that respondents themselves are polluters, specifically as consumers, with the implication that new environmental taxes would affect the cost of things they buy. (According to Hypothesis 2, making the personal costs of environmental taxes more salient should reduce support.)

[12] The wording in the ISSP was very slightly different: "How willing would you be to pay much higher taxes in order to protect the environment?" The WVS/EVS question was: "I would agree to an increase in taxes if the extra money were used to prevent environmental pollution."

3. Pointing out two specific products to which new environmental taxes would apply (petrol and electricity), and suggesting the prices of these already heavily taxed products would rise. (According to Hypothesis 3, taxing petrol and electricity specifically should reduce support.)
4. Stating that new revenues from environmental taxes would be spent on (unspecified) programmes for environmental protection. (According to hypothesis 4, hypothecating should increase support.)
5. Drawing respondents' attention to the possibility of the government not doing what it says, in having only "promised" to spend the tax revenue on the environment and offset the new taxes. (According to hypothesis 5a, only promising hypothecation should reduce support compared to it being a fact. According to hypothesis 5b, only promising to offset new taxes should reduce support compared to it being a fact.)

The experiment was conducted as part of the UK Understanding Society Innovation Panel (IP), a longitudinal survey representative of households in Britain (excluding Northern Ireland and north of the Caledonian Canal). The first wave of the Innovation Panel ran in 2008, and since then participants have been re-interviewed annually. The sample for the seventh, 2014, wave (IP7) consisted of households from the original 2008 sample as well as from refreshment samples added in 2011 and 2014. The data can be obtained from the UK Data Service.[13] IP7 generated interviews with 2413 individual respondents, 2236 of whom provided valid responses to one of

[13] Each wave of the IP entails both a household interview (conducted with one member of the household) and separate individual interviews with every member of the household (covering topics such as demographics, religion, health, employment, education, and politics). The household bill-payer or his/her spouse/partner (or another appropriate person) completes the household questionnaire, which includes an enumeration of all household members. Only household members aged 16 and over are interviewed in full, and received the environmental taxation experiment.

the ten questions about environmental taxes.[14] The allocation into treatment groups was done at the household level, so all eligible adults in a household received the same treatment/question.[15]

As explained earlier, the analyses below also take advantage of other baseline data collected as part of the Innovation Panel. In particular, I investigate how the effects of the randomly assigned treatments may vary according to a number of non-experimentally manipulated, background attitudinal characteristics.

As a measure of people's perceptions of the seriousness of environmental problems generally, I use an index comprising two questions about past and future climate change specifically:

- "As far as you know, would you say that average temperatures around the world have been higher in the last three years than before that, lower, or about the same?" (AVTEMP)
- "Do you believe that people in the UK will be affected by climate change in the next 30 years?" (OPECL30)

I take a response of "higher" to AVTEMP as stronger belief in climate change, since the scientific community agrees that the planet has been warming, with 15 of the

[14] There were 101 don't knows, refusals, and missing. For 76 respondents, another household member provided information about the respondent, rather than the respondent him/herself; these proxy interviews are excluded from the analyses. Of the 2337 non-proxy interviews, 1581 were conducted face-to-face, 4 by telephone, and 752 online. The 2413 respondents were members of 1427 different households; in a total of 58 households, 87 respondents completed the individual questionnaire, but nobody completed the household questionnaire, such that some household-level variables are missing. There were 657 households with a single respondent to the individual questionnaire, 612 with two, 112 with three, 35 with four, ten with five, and one with six.

[15] The IP is specifically focused on experimental tests of survey procedures and the content of the questionnaire. Brief descriptions of all the IP7 methodological experiments and their results are available from: www.understandingsociety.ac.uk/research/publications/working-paper/understanding-society/2015-03.pdf. Further methodological details are available at www.understandingsociety.ac.uk/d/204/6849_ip_waves1-7_user_manual_June_2015.pdf and www.understandingsociety.ac.uk/d/196/IP7_TechReport_v4.pdf (the latter also including information about response rates).

hottest 16 years on record occurring since 2001 (Bolden and Sullivan 2016; Karl et al. 2015). Goodman-Kruskal's *G* (a measure of association between two ordinal variables) for this index is 0.60), indicating an acceptably strong association between the two items. Disbelief in climate change is rare (20%).

Second, I measure left as opposed to right/liberal political views with an index comprising two questions JOBS and ADQHOUS about economic policy ($G = 0.45$):

- "Do you think the government should or should not see to it that every person has a job and a good standard of living?"
- "Some people feel the government should see to it that all people have adequate housing, while others feel each person should provide for his or her own housing. Which comes closest to how you feel about this?"

Since these two questions address support for the state's active intervention in the economy, I also refer to them as measuring economic liberalism (in the European rather than American sense). This variable's usefulness as a measure of left political ideology is demonstrated by its capturing meaningful partisan differences: its mean score for Conservative party sympathisers is 0.45, 0.64 for Liberal Democrats, and 0.77 for Labour.[16] Left ideology is prevalent by this measure—almost half of Conservatives subscribe to it—and it maps on well to the parties' relative placements on an overall left-right index, judging by their platforms.[17]

Third, background political cynicism is measured as an index comprising answers to two questions that have long been used to measure generic political distrust ($G = 0.52$; see Levi and Stoker 2000; Miller 1974):

[16] I do not examine party identification further in the analyses below because it is missing for a large number of respondents.
[17] See the Manifesto Project of Volkens et al. (2015), who scored Labour -1.50, the LibDems 4.66, and the Conservatives 17.54 in 2010 (http://manifesto-project.wzb.eu).

- "Do you think that quite a few of the people running the government are corrupt, not very many are, hardly any of them are corrupt, or do you not have an opinion?" (DCRKD)
- "Do you feel that almost all of the people running the government are smart people, or do you think that quite a few of them don't seem to know what they are doing, or do you not have an opinion on that?" (LDSMRT, reverse-coded)

Cynicism by these measures is widespread, with a mean score of 0.71—consistent for example with an Ipsos MORI poll of British adults in 2009 that found only 13% generally trusted politicians to tell the truth, the lowest proportion out of 16 types of people (Ipsos MORI 2010). Political cynicism is only minimally correlated with political ideology ($G = 0.09$).

Fourth, interest in politics, and potentially thereby people's understanding of policymaking, is captured by VOTE6 (with four ordered response options):

- "How interested would you say you are in politics?"[18]

Finally, demographic covariates are education (highest qualification), age in years (less the sample minimum of 16), rural as opposed to urban residence, gender (female is the reference category), and income (FIHHMNGRS_DV, gross household income in the month prior to the interview, divided both by 1000 and by the square root of the number of household members). Respondents were also asked to name the political party to which they feel closest. Many people did not identify a party, however, with only the Conservatives and Labour attracting more than just a few

[18] A number of unrelated experiments affected how these questions were asked. In the cases of LDSMRT, LDCRKD, AVTEMP, JOBS, and ADQHOUS, in each case respondents were randomly assigned to one of four versions of each question (two for AVTEMP). I ignore the distinctions in the analyses below. The random assignment to different wordings was done separately for each question, and the effects of the differences in wording were not large for any of these questions.

dozen sympathisers, so I limit the analysis of partisanship to just these two. At the time of the data collection, the Conservative Party was leading a coalition government, while Labour was the official opposition. Appendix B presents descriptive statistics for all these variables.

I present results below in the form of ordinal probit models fitted using the R package MCMCglmm (Hadfield 2010). Estimation was Bayesian, with flat priors. The probability of observing an outcome in category k is: $Pr(y=k) = F_N(\gamma_k|\mathbf{w}\boldsymbol{\theta}, \sigma_e^2) - F_N(\gamma_{k+1}|\mathbf{w}\boldsymbol{\theta}, \sigma_e^2)$, where F_N is the Normal distribution function, and σ_e^2 is fixed at 1. The γ's are cutpoints (with one γ equal to zero); **w** consists of fixed and random effects design matrices **X** and **Z**; and $\boldsymbol{\theta}$ comprises vectors of regression coefficients $\boldsymbol{\beta}$ and random intercepts **u**. Because some households included multiple respondents to the individual survey (and all members of each household received the same treatment for the experiment), I include a random intercept for households in each model. This had the effect of slightly widening the credible intervals for the coefficient estimates. Given the Bayesian estimation of the models, instead of frequentist p values, the tables with the fitted models below include the modelled probability that the sign of each estimated beta coefficient was the opposite of the mean value. (The coefficient estimates presented are posterior means.) This Bayesian approach allows for more straightforward inferences and quantification of uncertainty, estimating as it does the probability of a positive or negative relationship given the data, not the probability of the data given a null hypothesis which may or may not be true (see e.g., Gill 1999).

Results

First, Table 1 presents models of willingness to pay as a function of only observational data. These models investigate the demographic and attitudinal correlates of being willing to pay taxes to protect the environment. Model 1 includes only demographics—education, income, gender, age, and a dummy variable for rural rather than urban residence. Model 2 includes those demographics, plus a number of attitudinal covariates: belief in climate change, left ideology (versus economic liberalism), political cynicism, and interest in politics.

Model 1 shows that higher- versus lower-income earners are no different in their willingness, and nor are rural versus urban residents, or older rather than younger Britons. But men and women, and even more so education groups, differ significantly: women are more willing to pay to protect the environment, and so are more educated people.

Adding attitudinal covariates makes little differences to these demographic relationships.[19] Model 2 shows that, not surprisingly, respondents who believe in climate change are more willing to pay taxes. The politically cynical are less willing, and those with left political ideologies are more so (though there is an 8% chance they are less so). Ceteris paribus, those more interested in politics are also more willing.

[19] I do not include party identification in Model 2, given its very high level of missingness, but it appears in models presented below.

Table 1: Models with Observational Data Only		
Model	**1**	**2**
Fixed Effects		
Highest qualification:		
Other higher degree	-0.41**	-0.31**
	(0.00)	(0.00)
A-level or equivalent	-0.43**	-0.27**
	(0.00)	(0.00)
GCSE or equivalent	-0.75**	-0.55**
	(0.00)	(0.00)
Other	-0.77**	-0.52**
	(0.00)	(0.00)
None	-0.77**	-0.61**
	(0.00)	(0.00)
Income	0.02	0.01
	(0.31)	(0.43)
Rural	-0.10	-0.10
	(0.16)	(0.13)
Male	-0.15*	-0.18**
	(0.01)	(0.00)
Age	0.00	0.00
	(0.11)	(0.10)
Belief in Climate Change		1.23**
		(0.00)
Left Ideology		0.13
		(0.08)
Political Cynicism		-0.40**
		(0.00)
Interest in Politics		0.13**
		(0.00)
(Intercept)	1.55**	0.46*
	(0.00)	(0.02)
SD of the Random Effects		
Households	0.94	0.77
Cutpoints		
1	1.02	1.00
2	2.62	2.55
N (households, individuals)	1100, 1560	1100, 1560

Note: Random effects are presented on the standard deviation scale. Figures in parentheses are the modelled probabilities of the parameter having the opposite sign; coefficients are marked with * if the probability is less than 0.05, ** if less than 0.01. The reference category for highest qualification is possession of a degree.

Next, Table 2 presents the results of the five experiments, in the form of the raw percentages of respondents who provided each of the four possible answers,

under ten different combinations of the five experimental conditions. Table 2 shows that, among respondents who received the base version of the question (A), about a third provided each of the three less supportive responses, and only a small number (5%) gave the most supportive response ("very willing"). The distribution of responses varied substantially across the other nine scenarios, indicating that differences in question wording made a meaningful difference.[20]

Table 2: Raw Percentages of Each Response, by Combination of Conditions

	Offset	Things You Buy	Petrol and Electricity	Spent	Promised	Not at all willing (%)	Not very willing (%)	Fairly willing (%)	Very willing (%)	Valid N
A						29	33	33	5	234
B	X					7	19	44	30	221
C		X				25	30	39	6	198
D	X	X				10	16	44	30	222
E		X	X			28	44	25	3	214
F	X	X	X			16	20	43	21	219
G				X		25	36	35	4	238
H	X			X		14	21	44	22	218
I				X	X	27	29	37	6	235
J	X			X	X	23	24	38	15	237

Raw percentages of respondents giving each answer, depending on the combination of treatments they were assigned.

Table 3 presents the results of the experiments as analysed using multilevel models (such models being appropriate given the nesting of respondents within households). The first model in Table 3, with only dummies for the various experimental treatments on the right-hand side, presents the core findings of this paper.[21] First, revenue-neutrality is a strong means of increasing acceptance of

[20] Appendix E presents means and standard deviations by treatment group for each variable other than the outcome and the treatment indicators. Mutz and Pemantle (2015) do not recommend tests of balance across groups. A cursory glance at Table E1 suggests only trivial differences among the groups.

[21] Appendix C presents a model with each of nine treatment conditions entered simply as a dummy variables relative to the base category. The models in Table 3 could also have

environmental taxes: the coefficient on Offset is large. People are much more willing to pay if new environmental taxes are offset with tax cuts elsewhere. Hypothesis 1 is therefore supported.

Second, making the likely costs of increased environmental taxation more salient to respondents, by framing respondents themselves as polluters, makes no notable difference. Hypothesis 2 is therefore not supported. Third, however, naming petrol and electricity specifically as goods that would be subject to the hypothetical new tax substantially undermines support. Hypothesis 3 is therefore supported.

Fourth, and somewhat surprisingly, the evidence here suggests people are not more enthusiastic if green tax revenue is "Spent" on the environment. If anything, people are marginally *less* willing to pay new environmental taxes, if told that the revenues will also be spent specifically on programmes for environmental protection. Hypothesis 4 is therefore not supported.

Fifth, it seems few people trust government promises. The coefficient on "Promise" is not statistically significant by itself, but that is because (as per the previous paragraph) people appear not to want the revenues from green taxes to be spent on the environment. They therefore are not concerned about the risk of governments failing to follow through on this promise, and Hypothesis 5a is not supported. People do, however, care about how much tax they pay. Where the government's promise is not only to spend revenues on the environment, but also to offset new green taxes, then people have reason to worry about the risk of promised outcomes never materialising. The coefficient on the interaction effect "Offset : Promised", capturing how the effect of Offset changes if it is a government promise rather than a fait accompli, is negative and significant. Hypothesis 5b is therefore

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included interactions between Offset and other randomly assigned treatments, but I investigated and found that no such effects were statistically or substantively significant.

Table 3: Models including Randomly Assigned Treatments						
Model	**3**	**4**	**5**	**6**	**7**	**8**
Fixed Effects						
Offset	0.95**	1.06**	0.96**	0.87**	0.94**	0.98**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Things You Buy	0.07	0.50*	0.38*	-0.17	0.16	-0.01
	(0.21)	(0.05)	(0.01)	(0.24)	(0.15)	(0.49)
Petrol and Electricity	-0.32**	-0.42	-0.47**	-0.14	-0.42**	-0.21
	(0.00)	(0.07)	(0.00)	(0.28)	(0.00)	(0.13)
Spent	-0.13	0.21	0.01	0.16	0.02	-0.18
	(0.08)	(0.24)	(0.49)	(0.28)	(0.43)	(0.17)
Promised	0.16	0.27	-0.10	0.01	0.19	0.23
	(0.09)	(0.22)	(0.34)	(0.48)	(0.17)	(0.19)
Offset : Promised	-0.62**	-0.85*	-0.77**	-0.53	-0.76**	-0.80**
	(0.00)	(0.03)	(0.00)	(0.09)	(0.00)	(0.00)
Belief in Climate Change		1.69**				
		(0.00)				
Left Ideology			0.37*			
			(0.02)			
Political Cynicism				-0.64**		
				(0.01)		
Interest in Politics					0.28**	
					(0.00)	
Conservative (v. Labour)						-0.21
						(0.15)
: Offset		-0.22	0.04	0.15	-0.01	-0.05
		(0.19)	(0.40)	(0.24)	(0.44)	(0.40)
: Things You Buy		-0.55	-0.50*	0.43	-0.09	0.03
		(0.06)	(0.02)	(0.08)	(0.16)	(0.45)
: Petrol and		0.19	0.23	-0.33	0.09	-0.03
Electricity		(0.29)	(0.16)	(0.15)	(0.16)	(0.46)
: Spent		-0.40	-0.23	-0.41	-0.14	0.25
		(0.13)	(0.16)	(0.12)	(0.08)	(0.18)
: Promised		-0.08	0.45	0.24	-0.01	-0.47
		(0.43)	(0.08)	(0.27)	(0.45)	(0.08)
: Offset : Promised		0.28	0.18	-0.20	0.11	0.36
		(0.30)	(0.33)	(0.35)	(0.23)	(0.20)
(Intercept)	0.70**	-0.58**	0.47**	1.16**	0.36**	0.89**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SD of the Random Intercepts						
Households	0.64	0.58	0.67	0.75	0.60	0.46
Cutpoints						
1	0.97	0.98	0.96	0.98	0.96	0.86
2	2.42	2.47	2.47	2.50	2.43	2.35
N (households,	1385,	1339,	1339,	1211,	1385,	677,
individuals)	2236	2083	2101	1739	2231	785

Note: Figures in parentheses are the probabilities of the parameter having the opposite sign; coefficients are marked with * if the probability is less than 0.05, ** if less than 0.01.

supported. While revenue neutrality makes environmental protection much more appealing to the public, political cynicism appears to reduce the positive effects of framing new environmental taxes as such. Considering the relatively minor difference in the wording between versions H and J, the magnitude of the impact on the responses is surprisingly large.[22]

Models 4 through 8 in Table 3 are similar to Model 3, except that each one includes a series of interaction effects. In each model, one attitudinal covariate is interacted with each of the randomly assigned treatments. For each model, then, the first six rows in Table 3 present the effect of the treatment on the reference category: people who do not believe in climate change, who subscribe to economically liberal ideology, who are politically trusting, who are uninterested in politics, and who feel closest to the Labour Party, respectively. The next coefficient, in each model, indicates the difference between people holding the alternative and reference values for these attitudinal covariates—belief in climate change, etc. Then the next six coefficients capture the difference between the randomly assigned treatments' effect on people with the alternative and reference values for each of these attitudinal covariates. In other words, each of these models treats a different kind of person as the baseline against which another kind of person is compared, in order to test whether the effects of the treatments differ significantly across the two types.

As in Table 2 above, belief in climate change, subscribing to left/anti-liberal political ideology, being politically trusting, and being interested in politics all predict

[22] Note that H and J describe scenarios where total revenues stay the same, but spending increases. The result by implication will be a net deficit, which could be confusing to respondents, motivating them to be more sceptical. One reviewer suggested that the difference between the responses under scenario J compared to H could therefore be due to an "attention" rather than "trust" effect, with the reference to a government promise motivating people to think harder about the implied deficit. It is not clear, however, why a promise would enhance people's attentiveness unless they believed the promise/r to be untrustworthy.

more willingness to pay. The difference between Labour and Conservative voters is, on the other hand, marginal; there is even a 15% chance that Conservatives are more willing to pay. The important question to be asked of Models 5 through 8, however, is whether the effects of the various randomly assigned treatments differ substantially across different types of people. At first glance, the answer is generally that they do not, insofar as only one interaction effect is statistically significant, in Model 5.

In Model 6, unlike in the other models, the probability that the effect of Offset : Promised is negative is less than 95% for people in the reference category (not politically cynical). Yet the effect of this treatment is not much different for people who are politically cynical, judging by the coefficient on the interaction effect Cynical : Offset : Promised, which is estimated to be negative, but has a 35% chance of actually being positive. The fact that the effect of Promised is smaller for people who are not politically cynical reflects logically that they are less sceptical about politicians keeping their promises, as does the negative sign on the triple-interaction.[23]

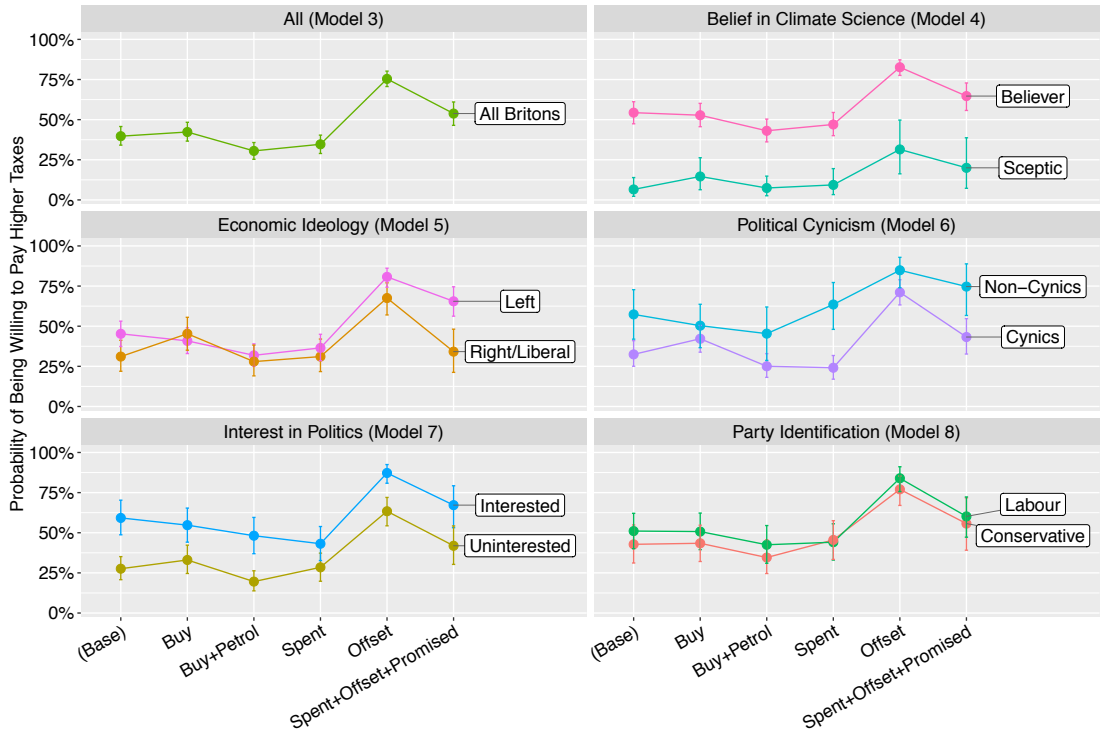
Since interpreting such interaction effects and the uncertainties about them is challenging, and to provide a sense of the magnitudes of all the effects, Figure 1 presents the expected responses by different types of people under six of the ten randomly assigned scenarios. The expected proportions, of respondents who are at least fairly willing to pay new environmental taxes, are derived from the models appearing in Table 3. The six panels present the results for Britons as a whole in the top-left and contrasting types of people in the other panels, where the contrasts are between people with the minimal and maximal values for each variable.

Out of all the different types of people presented in Figure 1, climate sceptics (who are a small minority) are clearly the most hostile to proposals for new

[23] Fitting the models with just DCRKD (rather than the summative index for cynicism also including LDSMRT) produced substantively similar results.

environmental taxes: almost none are willing to pay for new taxes in the base scenario. Yet even climate sceptics respond positively to revenue-neutrality, and indeed they respond to all the treatments in much the same ways as people who do believe in climate science. It would seem then that even people who are not very convinced about the seriousness of environmental problems can, to a degree, be won over.

Figure 1: Modelled Probabilities of Being Willing to Pay Higher Taxes to Protect the Environment, by Experimental Condition



Note: Expected proportions of various types of respondents being at least fairly willing to pay higher taxes in order to protect the environment, under six different scenarios (A, C, E, G, B, and J from Table 2, in order from left to right), derived from Models 3 through 8. The vertical lines represent 95% Bayesian credible intervals.

In the rest of the panels, the pairs of groups are less divided. People subscribing to right/liberal economic views are not much different from those subscribing to left views, suggesting that at least in Britain there is no great political divide with respect to willingness to pay new environmental taxes. These two groups

also respond similarly to most of the various randomly assigned treatments, though their responses differ somewhat to the Things You Buy and Offset : Promised scenarios.[24]

Two greater divides, which appear in the next two panels, are instead between the cynical and the non-cynical and between the politically interested and uninterested.[25] The politically interested and uninterested respond very similarly to the different treatments, while cynics and non-cynics are distinct in their responses to some treatments. As noted earlier in the discussion of Model 6, while the effect of Promised differs for respondents who report different background levels of political cynicism, the difference is not statistically significant. And Figure 1 makes clear that even people who report the lowest baseline levels of background cynicism are still somewhat sceptical of government promises—even if they are not as sceptical as cynics.[26]

There is also little distinction between people who feel closest to the Conservative party and those who feel closest to Labour. If anything, Conservatives (who might seem more sanguine about the honesty of people in government, since the British government was being run at the time of the survey by the Conservatives) evidence a more negative response to government promises. So it would seem that partisanship has little impact.

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[24] The divide between people with left and right/liberal views under the sixth scenario here reflects the large effect of Promised—alone, not interacted with Offset—for people on the left (see Model 5 in Table 3). The source of this effect has no obvious theoretical rationale or interpretation. There are many relationships being investigated with the models in Table 3, such that this finding may simply be a consequence of making multiple comparisons. I would not want to draw any strong conclusions on the basis of this or other isolated statistically significant coefficients. Overall, the results suggest that the effects of the treatments are strongly consistent across different kinds of people, not notably variable.

[25] Political cynicism and interest correlate, but not strongly (G = -0.20).

[26] The difference between scenarios H and J is statistically significant for cynics, but not for non-cynics.

In sum, every type of respondent is most willing to pay new environmental taxes where the new taxes are offset by tax reductions elsewhere. Every type is also however less willing where offsetting cuts to other taxes are only a government promise, rather than a fact. That framing revenue-neutrality as a government promise rather than a fact has such a marked effect suggests that few people regard government promises as credible. This result appears to validate the importance of the specific form of political distrust that is political cynicism.

There are two caveats about this finding, however. First, the number of respondents being compared here is modest—441, as shown in Appendix D. Nevertheless, a direct test of the statistical significance of the difference between the responses under conditions J and H shows that the difference is indeed significant. Second, it is a limitation of the experimental design that there is no condition under which just revenue-neutrality, not hypothecation, is a government promise. The difference between the responses under conditions H and J could be due merely to the greater complexity of the latter. Yet the difference between the two question versions is not large—J is just three words and 17 characters longer. There are then some reasons to remain circumspect about the evidence for a causal relationship, but not especially strong reasons.

Discussion and Conclusions

The survey experiments described in this article suggest reasons why the public is so often hostile to what policy experts generally consider the most effective means of protecting the natural environment. Consistent with results from qualitative focus groups, the public's hostility to environmental taxation appears to be due in

large part to political distrust; people want new green taxes introduced in tandem with offsetting cuts to other taxes, but they do not believe governments when they promise to make such cuts (Green Fiscal Commission 2009; Lorenzoni, Nicholson-Cole, and Whitmarsh 2007). Even in positive cases outside Britain, where a substantial new environmental tax has proven politically sustainable and the public has been accepting, there has been substantial scepticism about revenue neutrality (as for example in the case of British Columbia—see Harrison 2012.)

Further research would benefit from exploring how the relationship between political trust and willingness to pay environmental taxes may differ across different kinds of political/cultural contexts—such as low rather than high-trust societies. Britain is middling in this regard, among high-income nations. Especially given the hugely U.S.-focused character of the literature, we need more systematic comparisons of cross-national differences. More broadly, we also need to know more about the effects of different kinds of framing, and how such framing relates to attitudes towards taxation generally.

If the results here have pointed to revenue neutrality as a potentially useful tool for making environmental taxes more acceptable to the public, the findings about the effects of hypothecation are more cautionary. Given that a number of other studies have found positive effects of earmarking green tax revenues for spending on environmental protection, it may be that the question wording used here was too vague. Other studies have investigated the impact of naming very specific forms of environmental protection to which revenues could be devoted; perhaps such specificity is important. Future experiments could investigate this possibility as well.

More broadly, this study implies a need for some shift in emphasis in existing definitions of political trust. Most of the literature on the consequences for public

opinion defines political trust as people's satisfaction with government performance. That definition de-emphasises the importance of honesty and truthfulness and people's perceptions of whether politicians and public administrations possess these kinds of integrity. The experiments here show that most Britons do not trust their government to do what it says. Supporters of the governing party, who are presumably more satisfied with the government's actions, are just as sceptical as supporters of the opposition. Expectations about promise-keeping, not just satisfaction with performance, can therefore shape public opinion about public policies. With respect to environmental taxes specifically, even if the public were more satisfied with government performance, that would not appear to be enough to build greater public acceptance. Instead, the results presented here suggest that advocates of green taxation would still need to overcome a deficit of public confidence in the trustworthiness of government promises.

Finally, the results presented in this paper suggest that conventional measures of political trust do not perform as well as researchers might hope. Survey questions used to capture cynicism—itself only one facet of political trust—are not working to capture all of people's cynicism. Even people who do not appear to be cynical, judging by the conventional measures, evidence substantial cynicism when revealing their true feelings about government promises.

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Appendix A

A. How willing would you be to pay higher taxes in order to protect the environment?
B. How willing would you be to pay higher taxes in order to protect the environment, if the government reduced other taxes you pay by the same amount?
C. How willing would you be to pay higher taxes on things you buy that pollute the environment?
D. How willing would you be to pay higher taxes on things you buy that pollute the environment, if the government reduced other taxes you pay by the same amount?
E. How willing would you be to pay higher taxes on things you buy that pollute the environment, like petrol or electricity?
F. How willing would you be to pay higher taxes on things you buy that pollute the environment, like petrol or electricity, if the government reduced other taxes you pay by the same amount?
G. How willing would you be to pay higher taxes, if the government spent the extra money on protecting the environment?
H. How willing would you be to pay higher taxes, if the government spent the extra money on protecting the environment and reduced other taxes you pay by the same amount?
I. How willing would you be to pay higher taxes, if the government promised it would spend the extra money on protecting the environment?
J. How willing would you be to pay higher taxes, if the government promised it would spend the extra money on protecting the environment and reduce other taxes you pay by the same amount?

Appendix B

Table B1: Descriptive Statistics

Variable	Mean	Min	Max	Unique	Valid	SD
Age (years-16)	34.21	0	80	80	2413	18.17
Education						
Degree (reference)	0.25	0	1	2	2400	
Other higher degree	0.14	0	1	2	2400	
A-level etc.	0.22	0	1	2	2400	
GCSE etc.	0.24	0	1	2	2400	
Other qualification	0.07	0	1	2	2400	
No qualification	0.08	0	1	2	2400	
Party Identification						
Conservative	0.40	0	1	2	1099	
Labour	0.42	0	1	2	1099	
Other	0.18	0	1	2	1099	
Income	2.20	0	16.67	1356	2326	1.31
Male	0.46	0	1	2	2413	0.50
Rural	0.23	0	1	2	2413	0.42
Political Distrust	0.71	0	1	5	1788	0.32
LDSMRT	0.24	0	1	2	1988	0.43
DCRKD	1.30	0	2	3	1953	0.73
Belief in Climate Change	0.80	0	1	5	2141	0.26
G_OPECL30	0.85	0	1	2	2231	0.36
GW	1.48	0	2	3	2231	0.61
Left Ideology	0.63	0	1	3	2166	0.38
ADQHOUS	0.66	0	1	2	2190	0.47
JOBS	0.60	0	1	2	2220	0.49
Interest in Politics	1.34	0	3	4	2325	0.93

Appendix C

Table C1: Model with Treatment Dummies	
Fixed Effects	
Treatment B	1.15**
	(0.00)
Treatment C	0.16
	(0.11)
Treatment D	1.13**
	(0.00)
Treatment E	-0.11
	(0.19)
Treatment F	0.76**
	(0.00)
Treatment G	0.05
	(0.37)
Treatment H	0.84**
	(0.00)
Treatment I	0.12
	(0.17)
Treatment J	0.45**
	(`0.00)
(Intercept)	0.61**
	(0.00)
SD of the Random Intercepts	
Households	0.64
Cutpoints	
1	0.97
2	2.43
N (households, individuals)	1385, 2236

Note: Figures in parentheses are the modelled probabilities of the parameter having the opposite sign; coefficients are marked with * if the probability is less than 0.05, ** if less than 0.01.

Appendix D

Table D1: Model contrasting Scenarios H and J	
Fixed Effects	
Treatment J	-0.37**
	(0.01)
(Intercept)	1.35**
	(0.00)
SD of the Random Intercepts	
Households	0.75
Cutpoints	
1	0.85
2	2.30
N (households, individuals)	275, 441

Note: Figures in parentheses are the modelled probabilities of the parameter having the opposite sign; coefficients are marked with * if the probability is less than 0.05, ** if less than 0.01.

Table D2: Raw Counts of Responses in Scenarios H and J					
Treatment Group	**Not at all willing**	**Not very willing**	**Fairly willing**	**Very willing**	**Total Valid N**
H	30	46	97	49	222
J	50	53	84	32	219

Appendix E

Table E1: Means and Standard Deviations of Covariates by Treatment Group

	A	B	C	D	E	F	G	H	I	J
Age (years-16)	34.77	36.98	31.01	33.59	33.95	33.73	34.91	33.06	35.52	34.99
	(17.36)	(19.11)	(19.26)	(17.79)	(17.45)	(18.02)	(18.51)	(16.32)	(19.14)	(18.32)
Education										
Degree (reference)	0.24	0.24	0.28	0.29	0.26	0.24	0.23	0.24	0.22	0.20
	(0.43)	(0.43)	(0.45)	(0.46)	(0.44)	(0.43)	(0.42)	(0.43)	(0.41)	(0.40)
Other higher degree	0.11	0.12	0.12	0.11	0.12	0.16	0.19	0.13	0.14	0.16
	(0.32)	(0.33)	(0.33)	(0.32)	(0.33)	(0.37)	(0.39)	(0.34)	(0.35)	(0.37)
A-level etc.	0.22	0.22	0.22	0.21	0.19	0.25	0.19	0.21	0.22	0.25
	(0.42)	(0.41)	(0.41)	(0.41)	(0.39)	(0.43)	(0.39)	(0.41)	(0.42)	(0.44)
GCSE etc.	0.25	0.23	0.27	0.21	0.26	0.23	0.25	0.27	0.24	0.23
	(0.44)	(0.42)	(0.45)	(0.41)	(0.44)	(0.42)	(0.44)	(0.44)	(0.43)	(0.42)
Other qualification	0.10	0.08	0.04	0.08	0.07	0.06	0.06	0.07	0.08	0.07
	(0.30)	(0.27)	(0.20)	(0.27)	(0.25)	(0.24)	(0.23)	(0.25)	(0.27)	(0.26)
No qualification	0.07	0.11	0.06	0.09	0.10	0.07	0.08	0.08	0.10	0.10
	(0.26)	(0.31)	(0.24)	(0.28)	(0.30)	(0.25)	(0.27)	(0.27)	(0.30)	(0.29)
Party Identification										
Conservative	0.35	0.42	0.45	0.35	0.42	0.34	0.40	0.34	0.55	0.34
	(0.48)	(0.50)	(0.50)	(0.48)	(0.50)	(0.48)	(0.49)	(0.48)	(0.50)	(0.47)
Labour	0.50	0.37	0.38	0.43	0.37	0.44	0.47	0.42	0.28	0.55
	(0.50)	(0.48)	(0.49)	(0.50)	(0.49)	(0.50)	(0.50)	(0.50)	(0.45)	(0.50)
Other	0.15	0.21	0.18	0.22	0.20	0.21	0.14	0.24	0.17	0.12
	(0.36)	(0.41)	(0.38)	(0.42)	(0.40)	(0.41)	(0.34)	(0.43)	(0.38)	(0.32)
Income	2.05	2.21	2.13	2.31	2.16	2.27	2.25	2.43	2.29	1.93
	(1.02)	(1.10)	(1.24)	(1.32)	(1.25)	(1.42)	(1.38)	(1.50)	(1.68)	(1.09)
Male	0.42	0.45	0.47	0.43	0.45	0.44	0.48	0.49	0.48	0.46
	(0.49)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Rural	0.26	0.29	0.22	0.18	0.20	0.19	0.20	0.31	0.22	0.22
	(0.44)	(0.45)	(0.41)	(0.39)	(0.40)	(0.40)	(0.40)	(0.46)	(0.41)	(0.41)
Political Distrust	0.73	0.73	0.67	0.68	0.73	0.72	0.70	0.71	0.71	0.71
	(0.32)	(0.32)	(0.35)	(0.34)	(0.28)	(0.32)	(0.32)	(0.30)	(0.32)	(0.32)
LDSMRT	0.24	0.23	0.29	0.27	0.22	0.22	0.22	0.24	0.26	0.25
	(0.43)	(0.42)	(0.46)	(0.45)	(0.42)	(0.41)	(0.42)	(0.43)	(0.44)	(0.43)
DCRKD	1.34	1.34	1.22	1.24	1.34	1.32	1.20	1.33	1.31	1.32
	(0.73)	(0.72)	(0.76)	(0.78)	(0.70)	(0.72)	(0.74)	(0.73)	(0.72)	(0.75)
Belief in Climate Change	0.76	0.84	0.79	0.81	0.77	0.82	0.80	0.81	0.76	0.79
	(0.29)	(0.22)	(0.26)	(0.26)	(0.27)	(0.25)	(0.25)	(0.26)	(0.27)	(0.26)
G_OPECL30	0.81	0.89	0.83	0.86	0.83	0.89	0.85	0.86	0.81	0.86
	(0.40)	(0.31)	(0.38)	(0.35)	(0.38)	(0.32)	(0.36)	(0.35)	(0.40)	(0.35)
GW	1.45	1.54	1.47	1.53	1.42	1.51	1.49	1.53	1.40	1.44
	(0.63)	(0.62)	(0.60)	(0.62)	(0.62)	(0.59)	(0.63)	(0.60)	(0.62)	(0.60)
Left Ideology	0.64	0.59	0.58	0.66	0.62	0.64	0.64	0.60	0.65	0.66
	(0.38)	(0.39)	(0.40)	(0.38)	(0.38)	(0.38)	(0.37)	(0.37)	(0.37)	(0.38)
ADQHOUS	0.65	0.61	0.60	0.71	0.64	0.68	0.68	0.63	0.70	0.68
	(0.48)	(0.49)	(0.49)	(0.46)	(0.48)	(0.47)	(0.47)	(0.49)	(0.46)	(0.47)
JOBS	0.64	0.58	0.57	0.61	0.59	0.61	0.59	0.58	0.59	0.65
	(0.48)	(0.50)	(0.50)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)	(0.48)
Interest in Politics	1.19	1.32	1.42	1.38	1.19	1.41	1.47	1.37	1.36	1.32
	(0.97)	(0.92)	(0.89)	(0.87)	(0.93)	(0.96)	(0.92)	(0.90)	(0.95)	(0.92)